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ABSTRACT

Parent ability to diagnose the cause of non-contingent crying in an infant was investigated through use of a new methodological instrument. Problems programmed on a microcomputer presented 25 information units leading to only one correct causal hypothesis about infant crying and 25 information units similarly structured about an adult woman's insomnia. Subjects were 30 college-educated, upper-middle class women divided into four groups: inexperienced in infant caregiving, primiparae, multiparae, and (nulliparous) pediatric nurses. All subjects were instructed to select the fewest and only the most important information units in order to determine which of nine causal hypotheses was correct. Results suggest that women with some infant caregiving experience are, on average, more efficient and accurate in diagnosing the cause of crying in babies than women who have not had that experience. The three experienced groups (primiparous, multiparous, and nurses) only differed reliably from the nulliparous group, suggesting a novice-expert dichotomy. Nevertheless, the nulliparae performed surprisingly well, suggesting a cultural effect involving the provision of experiences to women to aid them in their future task of mothering. It is concluded that the use of computer-presented problems offers a promising new approach for addressing cognitive and cognitive-behavioral questions. (RH)

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DIAGNOSING WHY A BABY IS CRYING:

THE EFFECT OF CAREGIVING EXPERIENCE

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Diagnosing why a baby is crying: The effect of caregiving experience

The study of parental cognitions has begun to be recognized as an important topic for understanding the determinants of parental behavior and the context for child development. Along with the continuing investigations into parental attitudes, work has begun to examine such topics as parental knowledge (Stevens, 1984), theories about development (Goodnow, 1984), perceptions (Bugental & Shennum, 1984) and attributions (Dix & Grusec, 1985) about children. This study expands the scope of topics being studied in this area by examining the parental problem-solving process. Given that deliberating about and solving child-rearing problems characterizes much of parenting (Holden & West,1983), a "parents as problem-solvers" view is phenomenologically valid.

The study also introduces a new methodological instrument with which to assess the problem-solving process. Problems, programmed on a micro-computer, are interactively solved by the subject. This instrument affords various advantages over interviews or questionnaires. For example, by using a micro-computer to present the problems, certain methodological problems such as self-report bias and data reduction difficulties can be avoided (Holden, in press). Two problems were developed, one involving a common problem that all parents must deal with and one problem that served as a control.

The child-rearing problem selected was to diagnose the cause of non-contingent crying in an infant. Although a great deal of research has been conducted into the acoustical properties (e.g., Zeskind & Lester, 1978), parental reactions to the sound of cries (e.g., Frodi, Lamb, Leavitt & Donovan, 1978), little work has been directed at the cognitive process of how parents interpret the cause of crying in infants. Dunn (1977), based on her observations of parents, reported that rather than basing their

interpretation upon the sound of the cry itself, "They relied far more, both for interpretations and for decisions about how to respond, on a whole host of other features, such as how long it was since the baby had last been fed, how well he had fed last time, ..., and so on" (p. 9). Based on this work and other studies (e.g., Boukydis & Burgess, 1982), nine common causes of crying were selected (Table 1). Twenty-five information units were then constructed to lead to one and only one correct causal hypothesis.

A second problem, structured identically to the Cry Problem was developed to serve as a control problem. The problem selected was determining why a woman had insomnia. That situation is also characterized by ambiguity and information search in order to identify the correct cause. Both computer problems were extensively pilot-tested and revised before the study. In addition, two studies were conducted to validate the content and the causal relationship between the information units and the single correct cause in the Cry Problem (Holden, 1984).

METHOD

Thirty college-educated, upper-middle class women formed each of four groups: nulliparae (inexperienced in infant caregiving), primiparae, multiparae, and (nulliparous) pediatric nurses. The mean ages of the women were 28, 33, 36, and 27, respectively. All of the nurses and sixteen of the women from each of the other three groups participated in Chicago, IL; the remaining women solved the problems in Chapel Hill, NC. The order of the problem presentation was counter-balanced for the Chicago participants; those women in Chapel Hill solved the Insomnia Problem first. All the mothers had one or more children at least 12 months of age and all the nurses had been employed at least 2 years on a pediatric ward.

Both before and after operating the computer problems, participants filled out a number of brief questionnaires concerning their background, experience with infants and

computers, and reactions to the problems. A practice problem, similar to the Cry and Insomnia Problems was first demonstrated on the computer. That problem had fewer hypotheses and information units, but otherwise was structured the same as the two test problems.

Each of the experimental problems began with identical instructions: select the fewest and only the most important information units (out of the 25 units available) in order to determine which of the nine causal hypotheses was the correct one. (All of the possible hypotheses and information units were given to subjects on sheets of paper to avoid any memory requirements and are listed in Table 1.) Then the information stem appeared on the monitor which described the nature of the problem (in the Cry Problem: "A baby was crying in her crib, in her parents' home"). At that point the subjects had to select an information unit. Figure 1 provides a flow chart of the problems. After each unit was selected, the subjects had to decide whether they were ready to guess as to what the cause of the problem was. If they were not ready, they remained in the information acquisition loop; if they were ready to select a guess, they selected their choice and rated their confidence in that hypothesis. The computer then provided feedback as to whether they were right. If correct, a congratulatory message appeared and the problem was over. If they had selected an incorrect hypothesis, they had the choice of acquiring more information, selecting another hypothesis, or terminating the problem.

RESULTS

There were no group effects due to place of residence (Chicago vs. Chapel Hill) or order of problem presentation (Cry vs. Insomnia first). Only one group difference was found in the Insomnia Problem (on the first information unit selected), in contrast to the Cry Problem where there were a number of reliable group differences. Most of the differences in the Cry Problem were between the nulliparae and the other three groups.

The nulliparae requested a mean of 11 information units in contrast to an average of 8 units for the other groups ($F[3,119] = 3.17$, $p < .05$). Similarly, the nulliparae selected a mean of 2.0 hyptheses, compared to the other groups' means of 1.4 hypotheses ($F[3,119] = 2.94$, $p < .05$). A Least Significant Difference analysis revealed that for both these variables, the nulliparae differed from the other three groups, but the other groups did not differ from each other (see Figure 2 and Appendix 1 for the descriptive statistics). The groups also differed in the types of information selected. For example, as can be see in Figure 3, on the first unit requested, only 10% of the nulliparae requested information about the baby's age, in contrast to 64% of the multiparae (23% of the primiparae and 47% of the nurses). Over the first five information units, the multiparae selected the most amount of information about the "Baby" (38 %), while only 28 percent of the nulliparae's information choices came from that category. About 32% of the first five information units selected by the other two groups came from that category. Across all the groups over the first five information units selected, an average of 4% came from the "Parents" category, 34-40% came from the "Time" category, 13-16% was from the "Situation" information, and 10-14% was from the "Cry" information category.

Within each group of women, no two individuals solved the problems identically. In fact, within each group, performance on the number of information units selected ranged from about 3 to 20 units selected (see Appendix 1). No reliable differences emerged on the ratings of confidence in the hypothesis chosen, as many of the women selected the mid-point of the scale. Most of the women, regardless of previous experience with a computer, rated the instrument as "very easy to use", and the problems to be "very interesting" and "moderately" life-like.

DISCUSSION

The results suggest that women with some infant caregiving experience are, on average, more efficient and accurate in diagnosing the cause of crying in babies than women who have not had that experience. Interestingly, the three experienced groups (primiparous, multiparae, and nurses) only differed reliably from the nulliparous group, suggesting a novice-expert dichotomy. The multiparae did stand out by recognizing, on their first information choice, the importance of selecting the baby's age. Conversely, the nulliparous women's failure to select that unit was noteworthy. Nevertheless, the nulliparae performed surprising well, using, on average, only two more information units and not selecting many more incorrect hypotheses than the other groups. That finding suggests a cultural effect: women in our society are given experiences (e.g., babysitting) to aid them in their future task of mothering. A sample of males is currently being collected to address this question.

Besides informing us about how caregiving experience affects reasoning about a child-rearing problem, this study helps to differentiate some of the many cognitive tasks that are involved in parenting. The problems formalized an informal but common problem-solving process, namely diagnosing the cause of an event. A number of mothers commented "It really made me think" and "I never realized that I thought so much about solving problems like these." Additional problems, some of which have already been developed by the investigator, can be employed to examine other aspects of parental problem solving and reasoning. For example, in the Cry Problem, the multiparae selected the baby's age in order to anchor (Kahneman, Slovic & Tversky, 1982) the subsequent information acquired. What other heuristics, reasoning biases, and cognitive strategies do parents use in dealing with their often unpredictable, confusing, and changing offspring?

The use of computer-presented problems, pioneered in this study, offers a promising new approach for addressing cognitive and cognitive-behavioral questions.

Besides addressing basic research questions, this approach and instrument has applications for parents as well. First, computer programs could be developed to be patient and knowledgeable educators. Both the knowledge necessary for adequate parenting as well as some of the skills needed to rear children could be taught on micro-computers. A second application involves utilizing interactive computer programs to identify those individuals who may mistreat their children. There is some evidence to suggest that child abusers have inaccurate expectations about their children and have limited problem-solving abilities (e.g., Azar, Robinson, Hekimian & Twentyman, 1984). Problems, programmed on a computer, would provide a confidential, interesting, time and cost effective approach with which to combat certain types of parenting problems. And it may even aid those other parents who want to determine why their baby is crying.

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Table 1. Hypotheses and Information Units Available in the Cry Problem.

HYPOTHESES: The baby is:

- Sick
- Tired
- Hungry
- Startled
- Teething
- Wanting to Play
- Hurt or in Pain
- Too hot or too cold
- Needing diapers changed

INFORMATION UNITS:

About the Baby:
- Behavior earlier in the day
- Age
- How often she usually cries
- General Health
- Temperament or personality

About the baby's Parents:
- Whether mother breastfed baby
- Experience with babies
- How they usually respond to crying
- Relationship with the baby
- Parent's current mood

About the Time:
- Time since last fed
- Time since last slept
- Time since diapers changed
- Time since last played with
- Hours baby slept last night

About the Situation:
- What the baby is doing
- Who else is with the baby
- Noise level in the room
- Earlier events in the baby's day
- Temperature in the room

About the Cry:
- How long the baby's been crying
- How loud the cry is
- Urgency of the cry
- A tape-recorded sample of the cry
- How effective it is to comfort the baby when she is crying like this

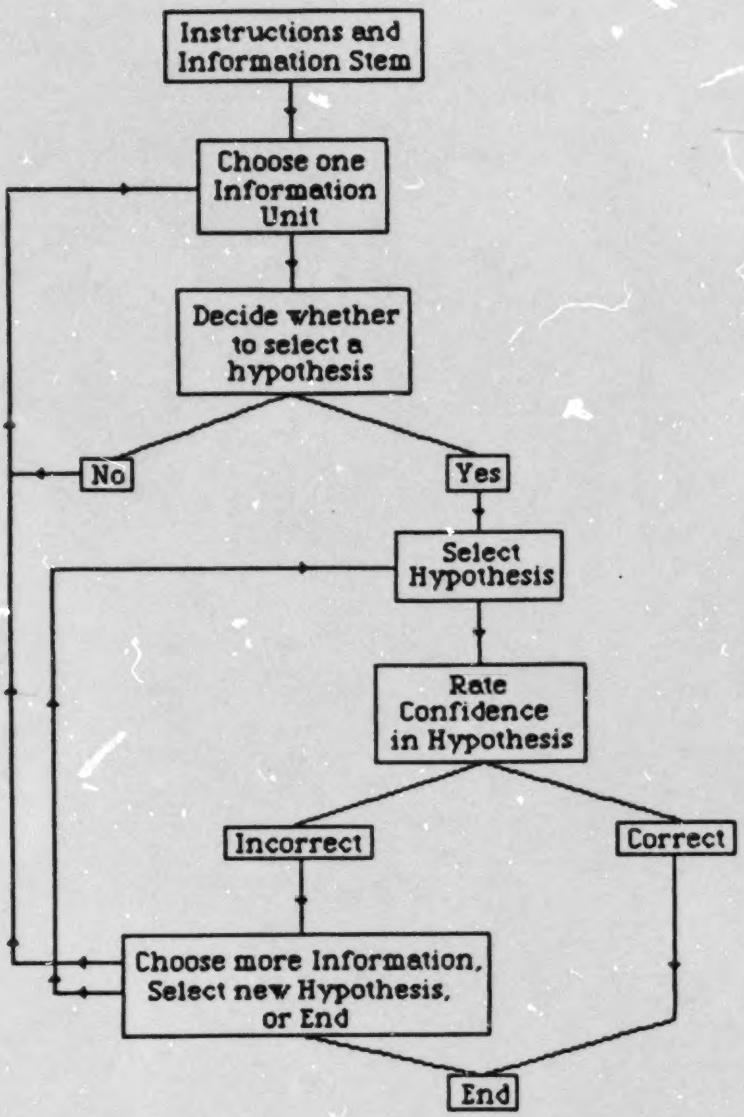

Figure 1. Flow Chart of the Problems

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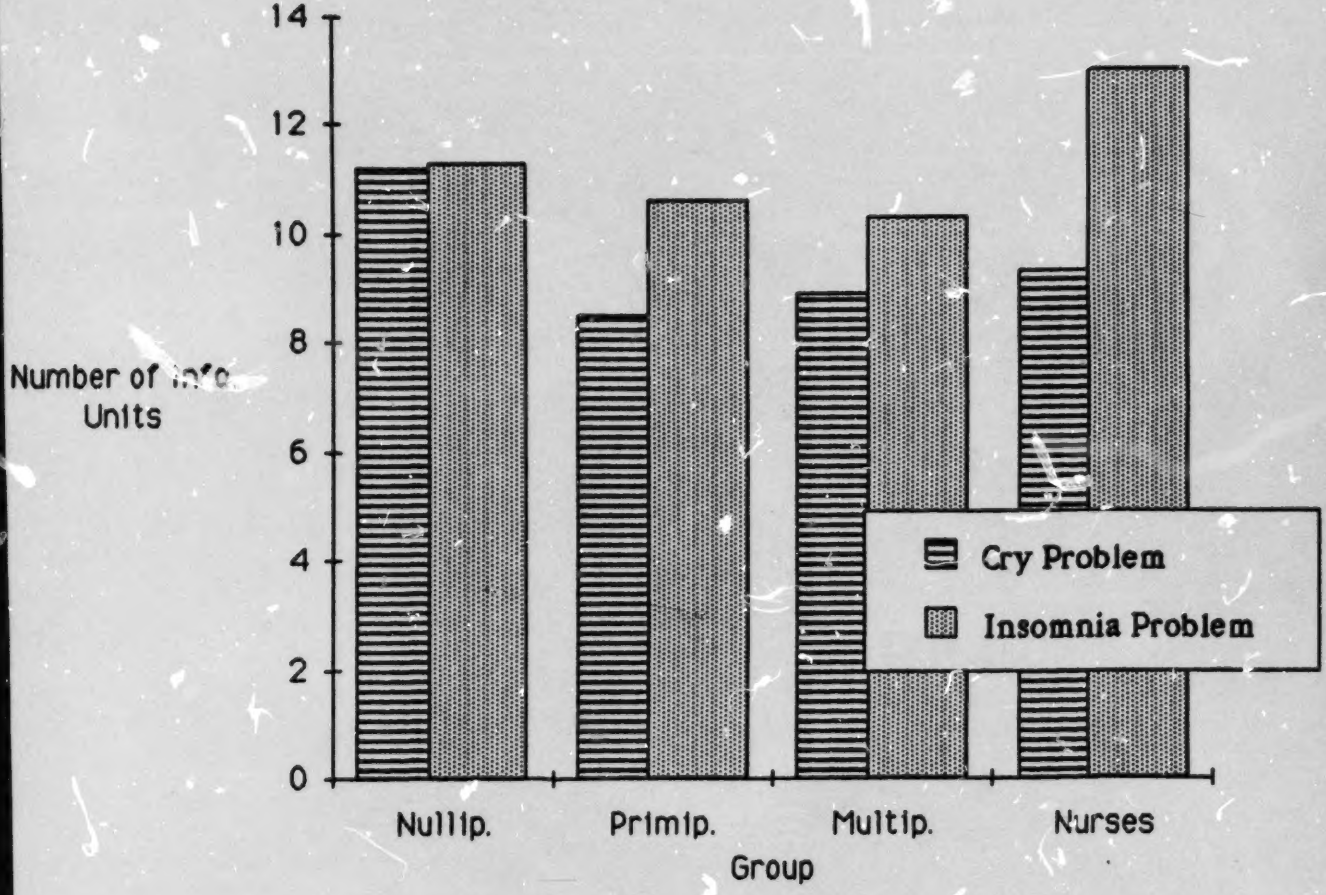

Figure 2. Number of Info. Units Selected

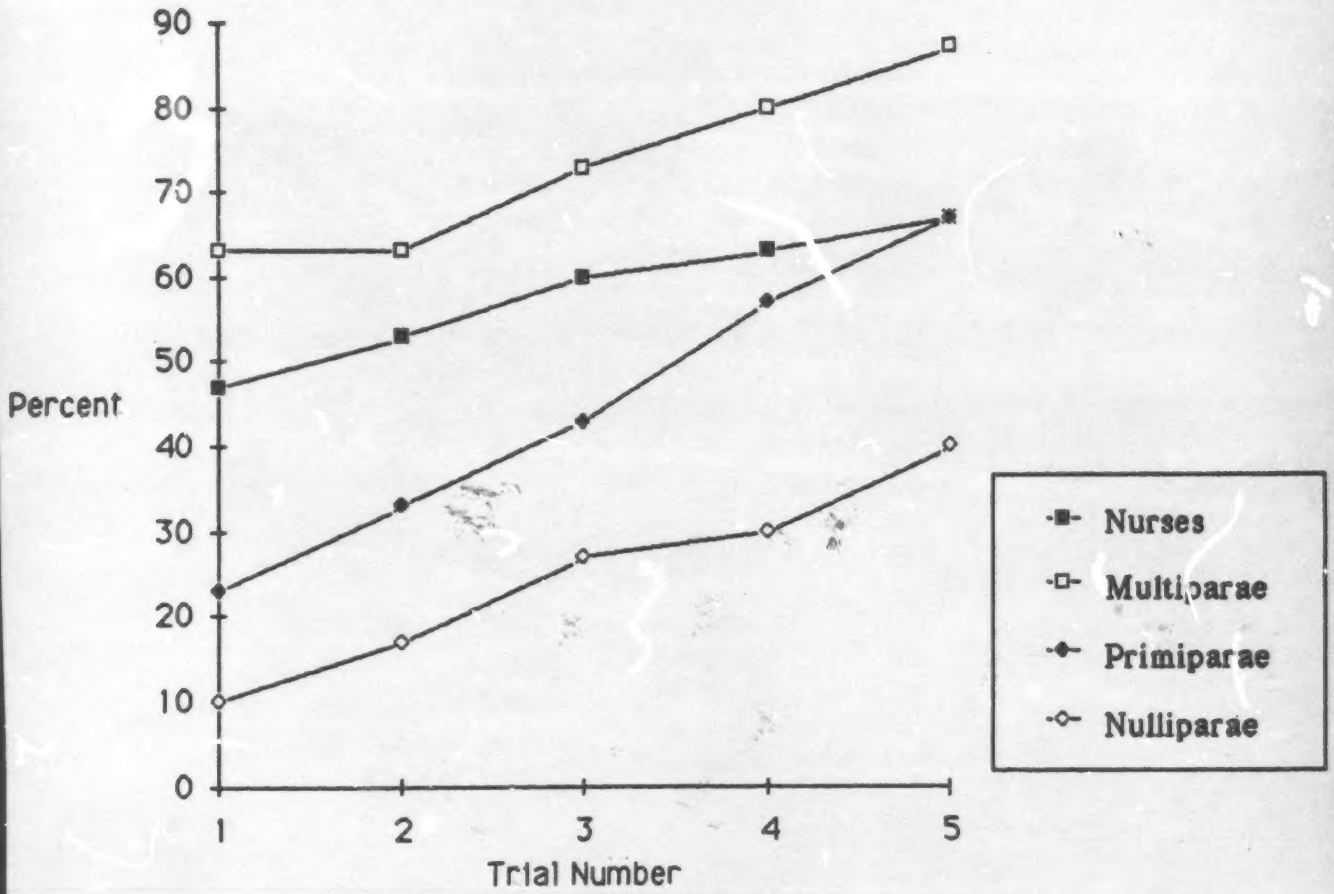

Figure 3. Percent Selecting the Baby's Age

Appendix 1. Information Units and Hypotheses Selected in the Two Problems

NUMBER OF INFORMATION UNITS SELECTED

	Insomnia Problem			Cry Problem		
	Mean	S.D.	Range	Mean	S.D.	Range
Nulliparae	11.3	5.5	1-21	11.2	3.1	6-18
Primiparae	10.6	5.0	3-21	8.5	3.1	3-17
Multiparae	10.3	4.5	4-21	8.9	3.3	2-18
Nurses	13.0	5.2	2-21	9.3	5.0	3-21

NUMBER OF HYPOTHESES SELECTED

	Insomnia Problem			Cry Problem		
	Mean	S.D.	Range	Mean	S.D.	Range
Nulliparae	1.6	1.1	1-6	2.0	1.1	1-4
Primiparae	1.3	.7	1-4	1.5	.8	1-3
Multiparae	1.2	.5	1-2	1.2	.5	1-2
Nurses	1.6	.9	1-4	1.6	.9	1-4